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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
FLORES, LEON	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/798,946	ZHIDKOV, SERGEY	
	Examiner	Art Unit	
	LEON FLORES	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-28* is/are allowed.

6)☒ Claim(s) *29-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 3/4/2008 have been fully considered but they are not persuasive.

Response to Remarks

Rejections Under 35 U.S.C. § 103 - Fertner

Applicant asserts that, *"Bohnke is directed to a method for adjusting the transmission characteristics of subcarriers of a multi cartier transmission system using a plurality of antenna elements. Bohnke discloses a TX antenna selection technique according to which the best suited antenna element for each subcarrier can be chosen at the transmitter.4 Bohnke also teaches a variety of other techniques that are used at the transmitter. Furthermore, neither Bohnke nor Fertner, taken singly or in combination (if such a combination could be made, which Applicants do not admit), fairly suggest utilizing the various transmitter techniques at the receiver. A person of ordinary skill would therefore have no motivation to combine the teachings of the two references".*

The examiner respectfully disagrees. The examiner did not, at any point, use the reference of Bohnke in his rejection. "**Claims (29 & 33) are rejected under 35 U.S.C. 103(a) as being unpatentable over Fertner. (US Patent 6,185,251 B1)".** The intent was to illustrate that "an inverse number of the squared magnitude of the channel frequency response" is just another way of saying "the best channel response" as taught by Bohnke et al. (See ¶ 43) As such, the reference of Fertner does suggest/disclose the limitations as claimed at the receiver. (See fig. 3)

Rejections Under 35 U.S.C. § 103 – Raleigh et al.

Applicant further asserts that, *"Raleigh teaches the sum of the squared Euclidean distance between each symbol in either the I-phase or the Q-phase. From this, the Examiner will surely appreciate that Raleigh does not teach, disclose or fairly suggest "a calculating unit which ... calculates a squared value of a signal for I (In-phase) and a squared value of a signal for Q (Quadrature) of the carrier and outputs an error, which is a sum of the squared values," as recited in independent claim 30 and the somewhat similar features recited in independent claim 34".*

The examiner respectfully disagrees. One skilled in the art would know that the Euclidean distance is measured in the In-phase and Quadrature plane (hereinafter IQ plane), and not in either I-phase or the Q-phase, as stated by applicant. The Euclidean distance is important because it gives us an idea how the channel is changing, by how much, and it also gives us information as to which of the 2N possible points, in the constellation, is the received signal more closer/nearer.

Rejections Under 35 U.S.C. § 103 – Chiou et al. in view of Fertner

Applicant further asserts that, *"Bohnke teaches a variety of TX antenna selection techniques according to which the best suited antenna element for each subcarrier can be chosen at the transmitter. Furthermore, neither Bohnke nor Fertner, taken singly or in combination, fairly suggest utilizing the various techniques from the transmitter at the receiver of a system to estimate the optimal coefficients for channel impairments. Even assuming arguendo the teachings of Bohnke and Fertner can be combined (which the*

Applicants do not admit); this would likely render the resultant combination inoperable. As such, Bohnke fails to overcome the noted deficiencies of Fertner which in turn fails to overcome the deficiencies of Chiou thereby rendering claim 31 and the somewhat similar features recited in claim 35 non-obvious to one of ordinary skill in the art".

The examiner respectfully disagrees. The examiner respectfully disagrees. The examiner did not, at any point, use the reference of Bohnke in his rejection. "**Claims (29 & 33) are rejected under 35 U.S.C. 103(a) as being unpatentable over Fertner. (US Patent 6,185,251 B1)".** The intent was to illustrate that "an inverse number of the squared magnitude of the channel frequency response" is just another way of saying "the best channel response" as taught by Bohnke et al. (See ¶ 43) As such, the reference of Fertner does suggest/disclose the limitations as claimed at the receiver. (See fig. 3)

Rejections Under 35 U.S.C. § 103 - Fertner

Applicant further asserts that, *"Bohnke teaches a variety of TX antenna selection techniques according to which the best suited antenna element for each subcarrier can be chosen at the transmitter. Furthermore, neither Bohnke nor Fertner, taken singly or in combination (if such a combination could be made, which Applicants do not admit), fairly suggest utilizing the various transmitter techniques at the receiver end of a system to estimate the optimal coefficients for channel impairments. Utilizing the teachings of Bohnke at the receiver of Fertner would likely render the resultant combination inoperable".*

The examiner respectfully disagrees. The examiner respectfully disagrees. The examiner did not, at any point, use the reference of Bohnke in his rejection. "**Claims (29 & 33) are rejected under 35 U.S.C. 103(a) as being unpatentable over Fertner. (US Patent 6,185,251 B1)".** The intent was to illustrate that "an inverse number of the squared magnitude of the channel frequency response" is just another way of saying "the best channel response" as taught by Bohnke et al. (See ¶ 43) As such, the reference of Fertner does suggest/disclose the limitations as claimed at the receiver. (See fig. 3)

Rejections Under 35 U.S.C. § 103 – Fertner in view of Raleigh

Applicant finally asserts that, *"Independent claim 32 recites features somewhat similar to independent claims 29, 30 and 31. Arguments with respect to claims 29, 30 and 31 also therefore apply to claim 32. Method claim 36 recites features somewhat similar to claim 32. Arguments with respect to claim 32 also therefore apply to claim 36. Accordingly, claims 32 and 36 are rendered non-obvious to one of ordinary skill in the art by Fertner in view of Raleigh. Therefore, Applicants respectfully request that this rejection of claims 32 and 36 under 35 U.S.C. §103 be withdrawn".*

The examiner respectfully disagrees. See response in previous arguments above.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims (29 & 33) are rejected under 35 U.S.C. 103(a) as being unpatentable over Fertner. (US Patent 6,185,251 B1)

Re claim 29, Fertner discloses a non-recursive carrier filtering device for an apparatus for direct measurement of channel state of a receiver, comprising: a delay unit which delays a first error by one or more carriers (See fig. 4); and a multiplier unit which multiplies filtering coefficients by a present carrier value and the one or more delayed carrier values and outputs a second error which is a sum of the multiplied values (See fig. 4).

But the reference of Fertner fails to explicitly teach that wherein the filtering

coefficients are output by an adaptation unit at the receiver using a signal corresponding to an inverse number of the squared magnitude of the channel frequency response and the second error signal is used to improve channel state estimation.

However, the reference of Fertner does suggest the teaching of calculating the optimal equalizer coefficients used to compensate for channel impairments. (See fig. 3 & col. 13, line 62 – col. 14, line 49, col. 15, line 63 – col. 16, line 8.) Furthermore, one skilled in the art would know that "an inverse number of the squared magnitude of the channel frequency response" corresponds to the best channel response, as taught by Bohnke (US Publication 2002/0060990) in paragraph 43.

Therefore, it would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Fertner, in the manner as claimed, for the benefit estimating the optimal coefficients.

Claim 33 is a method claim corresponding to system claim 29. Hence, the elements in system claim 29 would have necessitated the steps performed in method claim 33. Therefore, claim 33 has been analyzed and rejected w/r to claim 29 above.

4. **Claims (30 & 34) are rejected under 35 U.S.C. 103(a) as being unpatentable over Raleigh et al. (hereinafter Raleigh) (US Patent 6,158,041)**

Re claim 30, Raleigh discloses a squared Euclidean distance calculating device for an apparatus for direct measurement of a channel state of a receiver, comprising: a calculating unit which receives a complex signal for a carrier and calculates a squared

value of a signal for I (In-phase) and a squared value of a signal for Q (Quadrature) of the carrier and outputs an error, wherein the error is used to improve channel state estimation. (See fig. 7 & col. 8, lines 45-58)

But the reference of Raleigh fails to explicitly teach which is a sum of the squared values.

However, the reference of Raleigh does suggest the teachings of a periodic distance vector corresponding to the sum of the squared Euclidean distance. (See col. 5, lines 30-46)

Therefore, it would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Raleigh, in the manner as claimed, for the benefit estimating the channel impairments.

Claim 34 is a method claim corresponding to system claim 30. Hence, the elements in system claim 30 would have necessitated the steps performed in method claim 34. Therefore, claim 34 has been analyzed and rejected w/r to claim 30 above.

5. **Claims (31 & 35) are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiou et al. (hereinafter Chiou) (US Publication 2004/0218519 A1), and in view of Fertner. (US Patent 6,185,251 B1)**

Re claim 31, Chiou discloses an adaptation device for an apparatus for direct measurement of a channel state of a receiver, comprising: an estimating unit which estimates a correlation coefficient signal of two or more adjacent carriers using a signal

corresponding to an inverse number of a squared magnitude of the channel frequency response at the receiver. (See paragraph 11 & 19. It is notoriously well known that channel responses are calculated from pilots. One skilled in the art would know that there are pilot sub-carriers and data sub-carriers. Furthermore, one skilled in the art would also know that one way to estimate the channel is to perform a correlation between adjacent carriers.); and a filter coefficient selection unit which outputs filtering coefficients belonging to a filtering coefficient group selected according to the estimated correlation coefficient signal, wherein the filtering coefficients are used to improve channel state estimation. (See paragraph 19. Correction and equalization is performed based on the channel response.)

But the reference of Chiou fails to specifically disclose that the correlation coefficient signal of two or more adjacent carrier using a signal corresponding to an inverse a squared magnitude of the channel frequency response.

However, Fertner does. (See fig. 3 & col. 11, lines 21-26, col. 13, line 62 – col. 14, line 48) The reference of Fertner discloses the teaching of calculating the optimal equalizer coefficients used to compensate for channel impairments. Furthermore, one skilled in the art would know that "an inverse number of the squared magnitude of the channel frequency response" corresponds to the best channel response, as taught by Bohnke (US Publication 2002/0060990) in paragraph 43, and when performing a correlation between adjacent carriers the correlation exhibiting the highest peaks are taken to be the best correlations).

Therefore, taking the combined teachings of Chiou and Fertner as a whole, it

would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Chiou, in the manner as claimed and as taught by Fertner, for the benefit of estimating the optimal coefficients to compensate for channel impairments.

Claim 35 is a method claim corresponding to system claim 31. Hence, the elements in system claim 31 would have necessitated the steps performed in method claim 35. Therefore, claim 35 has been analyzed and rejected w/r to claim 31 above.

6. **Claims (31 & 35) are rejected under 35 U.S.C. 103(a) as being unpatentable over Fertner. (US Patent 6,185,251 B1)**

Re claim 31, Fertner discloses an adaptation device for an apparatus for direct measurement of a channel state of a receiver, comprising: a filter coefficient selection unit which outputs filtering coefficients belonging to a filtering coefficient group selected according to the estimated correlation coefficient signal, wherein the filtering coefficients are used to improve channel state estimation. (See col. 11, lines 23-26, col. 13, line 64 – col. 14,line 48 & figures 4 & 5)

But the reference of Fertner fails to explicitly teach an estimating unit which estimates a correlation coefficient signal of two or more adjacent carriers using a signal corresponding to an inverse number of a squared magnitude of the channel frequency response at the receiver.

However, the reference of Fertner does suggest (See fig. 3 & col. 13, line 62 – col. 14, line 49, col. 15, line 63 – col. 16, line 8.) the teachings of calculating the optimal

equalizer coefficients used to compensate for channel impairments. Furthermore, one skilled in the art would know that "an inverse number of the squared magnitude of the channel frequency response" corresponds to the best channel response, as taught by Bohnke (US Publication 2002/0060990) in paragraph 43.

Therefore, it would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Fertner, in the manner as claimed, for the benefit estimating the optimal coefficients.

Claim 35 is a method claim corresponding to system claim 31. Hence, the elements in system claim 31 would have necessitated the steps performed in method claim 35. Therefore, claim 35 has been analyzed and rejected w/r to claim 31 above.

7. **Claims (32 & 36) are rejected under 35 U.S.C. 103(a) as being unpatentable over Fertner (US Patent 6,185,251 B1), and in view of Raleigh et al. (hereinafter Raleigh) (US Patent 6,158,041)**

Re claim 32, Fertner discloses an apparatus for direct measurement of a channel state of a receiver, comprising: a non-recursive carrier filtering device, at the receiver, including a delay unit which delays the first error by one or more carriers and a multiplier unit which multiplies the filtering coefficients by a present carrier value and the one or more delayed carrier values and outputs a second error which is a sum of the multiplied values, wherein the second error signal is used to improve channel state estimation. (See fig. 4 & col. 13, line 62 – col. 14, line 49, col. 15, line 63 – col. 16, line 8.)

But the reference of Fertner fails to explicitly teach an adaptation device, at the receiver, including an estimating unit which estimates a correlation coefficient signal of two or more adjacent carriers using a signal corresponding to an inverse number of a squared magnitude of the channel frequency response and a filter coefficient selection unit which outputs filtering coefficients belonging to a filtering coefficient group selected according to the estimated correlation coefficient signal.

However, the reference of Fertner does suggest the teachings of an adaptation device including an estimating unit which estimates a correlation coefficient signal of two or more adjacent carriers using a signal corresponding to an inverse a squared magnitude of the channel frequency response and a filter coefficient selection unit which outputs filtering coefficients belonging to a filtering coefficient group selected according to the estimated correlation coefficient signal. (See col. 11, lines 23-26, col. 13, line 64 – col. 14, line 48 & figures 4 & 5)

Therefore, it would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Fertner, in the manner as claimed, for the benefit estimating the optimal coefficients.

The reference of Fertner discloses the limitations as claimed above, except he fails to explicitly teach a squared Euclidean distance calculating device including a calculating unit which receives a complex signal for a carrier and calculates a squared value of a signal for I (In-phase) and a squared value of a signal for Q (Quadrature) of the carrier and outputs a first error, which is a sum of the squared values.

However, Raleigh does. (See fig. 7 & col. 8, lines 45-58) Raleigh discloses

a calculating unit which receives a complex signal for a carrier and calculates a squared value of a signal for I (In-phase) and a squared yalue of a signal for Q (Quadrature) of the carrier and outputs an error, wherein the error is used to improve channel state estimation.

Therefore, taking the combined teachings of Fertner and Raleigh as a whole, it would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Fertner, in the manner as claimed and as taught by Raleigh, for the benefit of estimating the channel impairments.

The combination of Fertner and Raleigh discloses the limitations as claimed above, except they fail to explicitly teach which is a sum of the squared values.

However, the reference of Raleigh does suggest the teachings of a periodic distance vector corresponding to the sum of the squared Euclidean distance. (See col. 5, lines 30-46)

Therefore, it would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Fertner, as modified by Raleigh, in the manner as claimed, for the benefit estimating the channel impairments.

Claim 36 is a method claim corresponding to system claim 32. Hence, the elements in system claim 32 would have necessitated the steps performed in method claim 36. Therefore, claim 36 has been analyzed and rejected w/r to claim 32 above.

Allowable Subject Matter

1. Claims 1-28 are allowed.

Conclusion

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON FLORES whose telephone number is (571)270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. F./
Examiner, Art Unit 2611
May 7, 2008

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611